

# Advisory Circular

U.S. Department of Transportation Federal Aviation Administration

Subject: INDEX OF AVIATION TECHNICAL

STANDARD ORDERS

Date: 5/30/97

AC No: 20-110J

Initiated by: AIR-120

Change:

- 1. <u>PURPOSE</u>. This advisory circular (AC) describes the public procedures the Federal Aviation Administration (FAA) will use to develop and issue Technical Standard Orders (TSO's) for aeronautical articles to be used on civil aircraft. The AC presents an index of the FAA TSO's which contain minimum performance standards for specified materials, parts, processes, and appliances used on civil aircraft.
- 2. <u>CANCELLATION</u>. Advisory Circular 20-110H, Index of Aviation Technical Standard Orders, dated May 6, 1993, is canceled.
- 3. RELATED FAR SECTIONS. Federal Aviation Regulations (FAR), Part 21, Subpart O.
- 4. <u>BACKGROUND</u>. On June 2, 1980, by Amendment 21-50 to FAR Part 21, the FAA adopted a new public procedure for issuing TSO's for specified materials, parts, processes, and appliances used on civil aircraft, relocated the substance of Subpart A of FAR Part 37 to Subpart O of FAR Part 21, and revoked the remainder of FAR Part 37. Amendment 21-50 became effective on September 9, 1980.
- 5. <u>PUBLIC PROCEDURE</u>. The following is the public procedure the FAA will use to develop and issue final TSO's for specific articles used on civil aircraft.
- a. The FAA will continue to develop proposed TSO's and will use, by reference in the TSO, documents prepared and issued by organizations such as the RTCA, Inc. (RTCA) and the Society of Automotive Engineers (SAE). Notices of RTCA meetings and invitations will continue to be published in the <u>Federal Register</u> to allow public participation at the early stages of document development.
- b. Copies of documents prepared and issued by an organization that are incorporated by reference in proposed or final TSO's will be made available to interested persons in accordance with FAA regulations.
- c. Any person may request the Administrator to revise or issue a new TSO by submitting a description of the revision sought or a description of the new article for which a TSO is requested.

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d. The FAA will use several methods to ensure that the public is afforded early opportunities to take part in the TSO decisionmaking process. Proposed TSO's are normally distributed to the public for comment through the use of mailing lists. Any individual or organization can request to be placed on the TSO mailing lists. A notice of availability for comment of each proposed TSO is published in the <u>Federal Register</u>, and a copy of each final TSO is mailed to all persons on the mailing list.

- e. Any person wishing to submit comments on a proposed TSO may do so. All comments received on or before the closing date for comments will be considered by the Administrator before issuing a final TSO. Late comments may also be considered as long as no additional expense or delay in processing the TSO is incurred.
- f. All comments submitted will be available, both before and after the closing date for comments, for examination by interested persons. Comments are located at the FAA Headquarters in the Aircraft Certification Service, Aircraft Engineering Division (AIR-100), Room 815, 800 Independence Avenue, SW., Washington, D.C. 20591, between 8:30 a.m. and 4:30 p.m., Monday thru Friday.
- g. Copies of proposed TSO's, FAA Resolution of Comments, and final TSO's will also be available at the FAA Headquarters in the Aircraft Certification Service, Aircraft Engineering Division (AIR-100), and at all FAA Regional Aircraft Certification Offices (ACO's). Final TSO's will not be published in the Federal Register.
- 6. <u>INDEX OF TSO's</u>. For the reader's convenience, the index of TSO's is presented both numerical sequence (appendix 1) and by subject matter (appendix 2). All TSO standards contained in FAR Part 37, Subpart B, as of September 9, 1980, are current under the TSO revision program, unless appendix 1 of this AC shows a later revision date.
- 7. HOW TO OBTAIN TSO's. To obtain a copy of any of the TSO's listed in appendices 1 or 2, write to the: U.S. Department of Transportation, Subsequent Distribution Office, Ardmore East Business Center, 3341 Q 75th Avenue, Landover, MD 20785. To have your name placed on our mailing list to receive future issuances of TSO's, notices for public comment on proposed TSO's or copies of proposed TSO's, write to the: Federal Aviation Administration, Aircraft Engineering Division (AIR-100), 800 Independence Avenue, SW., Washington, D.C. 20591.

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## APPENDIX 1. INDEX OF TSO's IN NUMBERICAL SEQUENCE

TSO Number	Subject Title
TSO-C1c - 7/10/87	Cargo and Baggage Compartment Smoke Detection Instruments
TSO-C2d - 6/14/89	Airspeed Instruments
TSO-C3d - 6/14/89	Turn and Slip Instrument
TSO-C4c	Bank and Pitch Instruments (Indicating Gryro-Stabilized Type) (Gyroscopic Horizon, Attitude Gyro)
TSO-C5e - 6/14/89	Direction Instrument, Non-magnetic (Gyro-Stabilized Type)
TSO-C6d - 6/14/89	Direction Instrument, Magnetic (Gyro-Stabilized Type)
TSO-C7d - 6/14/89	Direction Instrument, Magnetic Non-Stabilized Type (Magnetic Compass)
TSO-C8d - 8/8/91	Vertical Velocity Instrument (Rate-of-Climb)
TSO-C9c	Automatic Pilots
TSO-C10b	Aircraft Altimeter, Pressure Actuated Sensitive Type
TSO-C11e - 10/17/91	Fire Detectors (Thermal Sensing and Flame Contact)
TSO-C13f - 9/24/92	Life Preservers
TSO-C14b - 2/15/90	Aircraft Fabric, Intermediate Grade, External Covering Material
TSO-C15d - 2/26/90	Aircraft Fabric, Grade A, External Covering Material
TSO-C16	Air-Speed Tubes (Electrically Heated)
TSO-C19b	Portable Water-Solution Type Fire Extinguishers
TSO-C20	Combustion Heaters
TSO-C21b - 3/16/89	Special Aircraft Turnbuckle Assemblies and/or Turnbuckle Safetying Devices
TSO-C22g - 3/5/93	Safety Belts
TSO-C23d - 6/1/94	Personnel Parachutes Assemblies

TSO Number	Subject Title
TSO-C25a	Aircraft Seats and Berths (Type I Transport, 6g Forward Load)
TSO-C26c - 5/18/84	Aircraft Wheels and Wheel-Brakes Assemblies, with Addendum I
TSO-C27	Twin Seaplane Floats
TSO-C28	Aircraft Skis
TSO-C30c - 5/12/89	Aircraft Position Lights
TSO-C31d - 4/30/84	High Frequency (HF) Radio Communication Transmitting Equipment Operating Within Radio Frequency Range of 1.5 to 30 Megahertz
TSO-C32d - 4/30/84	High Frequency (HF) Radio Communication Receiving Equipment Operating Within the Radio Frequency Range of 1.5 of 30 Megahertz
TSO-C34e - 1/15/88	ILS Glide Slope Receiving Equipment Operating Within 328.6 to 335.4 Megahertz
TSO-C35d	Airborne Radio Marker Receiving Equipment
TSO-C36e - 1/25/88	ILS Localizer Receiving Equipment
TSO-C37d - 9/23/92	VHF Radio Communications Transmitting Equipment Operating Within 117.975 to 137.000 Megahertz
TSO-C38d - 9/23/92	VHF Radio Communications Receiving Equipment Operating Within 117.975 to 137.000 Megahertz
TSO-C39b -4/1/87	Aircraft Seats and Berths
TSO-C40c - 1/25/88	VOR Radio Receiving Equipment Operating Within the Radio Frequency Range of 108-118 Megahertz
TSO-C41d - 5/6/85	Airborne Automatic Direction Finding (ADF) Equipment
TSO-C42	Propeller Feathering Hose Assemblies (Rubber and Wire Braid Construction)

TSO Number	Subject Title
TSO-C43b - 8/8/91	Temperature Instruments
TSO-C44b - 5/10/95	Fuel Flowmeters
TSO-C45a - 2/28/95	Manifold Pressure Indicating Instruments
TSO-C46a	Maximum Alowable Airspeed Indicator Systems
TSO-C47	Pressure Instruments - Fuel, Oil, and Hydraulic
TSO-C48	Carbon Monoxide Detector Instruments
TSO-C49b - 5/30/95	Electric Tachometer: Magnetic Drag (For Air Carrier Aircraft)
TSO-C50c - 1/31/83	Audio Selector Panels and Amplifiers
TSO-C52b - 5/30/95	Flight Directors
TSO-C53a	Fuel and Engine Oil System Hose Assemblies (Rubber or Tetrafluoreothylene Tube and Wire Braid Construction)
TSO-C54	Stall Warning Instruments
TSO-C55	Fuel and Oil Quantity Instruments (For Reciprocating Engine Aircraft)
TSO-C56a - 4/12/84	Engine-Driven Direct Current Generators/Starter Generators
TSO-C57a - 1/31/83	Aircraft Headsets and Speakers
TSO-C58a - 1/31/83	Aircraft Microphones (For Air Carrier Aircraft)
TSO-C59	Airborne Selective Calling Equipment (For Aircraft)
TSO-C60b - 5/11/88	Airborne Area Navigation Equipment Using Loran C Inputs

TSO Number	Subject Title
TSO-C62d - 9/7/90	Aircraft Tires
TSO-C63c - 8/18/83	Airborne Weather and Ground Mapping Pulsed Radars
TSO-C64a - 8/25/89	Oxygens Mask Assembly Continuous Flow, Passenger (For Air Carrier Aircraft)
TSO-C65a - 8/18/83	Airborne Doppler Radar Ground Speed and/or Drift Angle Measuring Equipment (For Air Carrier Aircraft)
TSO-C66c - 1/18/91	Distance Measuring Equipment (DME) Operating within the Radio Frequency Range of 960-1215 Megahertz
TSO-C67	Airborne Radar Altimeter Equipment (For Air Carrier Aircraft)
TSO-C68a - 8/18/83	Airborne Automatic Dead Reckoning Computer Equipment Utilizing Aircraft Heading and Doppler Ground Speed and Drift Angle Data (For Air Carrier Aircraft)
TSO-C69b - 8/17/88	Emergency Evacuation Slides, Ramps, and Slide/Raft Combinations
TSO-C70a - 4/13/84	Liferafts (Reversible and Nonreversible)
TSO-C71	Airborne Static ("DC to DC") Electrical Power Converter (For Air Carrier Aircraft)
TSO-C72c - 2/19/87	Individual Flotation Devices
TSO-C73	Static Electrical Power Invertor
TSO-C74c	Airborne ATC Transponder Equipment
TSO-C75	Hydraulic Hose Assemblies
TSO-C76	Fuel Drain Valves
TSO-C77a - 7/20/81	Gas Turbine Auxiliary Power Units

TSO Number	Subject Title
TSO-C78	Crewmember Demand Oxygen Masks
TSO-C79	Fire Detector (Radiation Sensing Type)
TSO-C80	Flexible Fuel and Oil Cell Material
TSO-C85a - 3/7/96	Survivor Locator Lights
TSO-C87	Airborne Low-Range Radio Altimeter
TSO-C88a - 8/18/83	Automatic Pressure Altitude Reporting Code Generating Equipment
TSO-C89	Oxygen Regulators, Demand
TSO-C90c - 4/3/92	Cargo Pallets, Nets, and Containers
TSO-C91a - 4/29/85	Emergency Locator Transmitters (ELT) Equipment
TSO-C92c - 3/19/96	Ground Pxoimity Warning-Glide Slope Deviation Alerting Equipment
TSO-C93	Airborne Interim Standard Microwave Landing System Converter Equipment
TSO-C94a - 8/12/81	Omega Receiving Equipment Operating Within the Radio Frequency Range of 10.2 to 13.6 Kilohertz
TSO-C95 - 8/18/83	Mach Meters
TSO-C96a - 4/7/89	Anticollision Lights System
TSO-C97	Lithium Sulfur Dioxide Batteries
TSO-C99 - 6/27/83	Protective Breathing Equipment
TSO-C101 - 2/19/87	Over Speed Warning Instruments
TSO-C102 - 4/2/84	Airborne Radar Approach and Beacon Systems for Helicopters

TSO Number	Subject Title
TSO-C103 - 4/12/84	Continuous Flow Oxygen Mask Assembly (For Non- Transport Category Aircraft)
TSO-C104 - 6/22/82	Microwave Landing Systems (MLS) Airborne Receiving Equipment
TSO-C105 - 6/13/84	Optional Display Equipment for Weather and Ground Mapping Radar Indicators
TSO-C106 - 1/15/88	Air Data Computer
TSO-C109 - 12/9/85	Airborne Navigation Data Storage System
TSO-C110a - 10/26/88	Airborne Passive Thunderstorm Detection Systems
TSO-C112 - 2/5/86	Air Traffic Control Radar Beacon System/Mode Select (ATCRBS/Mode S) Airborne Equipment
TSO-C113 - 10/27/86	Airborne Multipurpose Electronic Display
TSO-C114 - 3/27/87	Torso Restraint Systems
TSO-C115b - 9/30/94	Airborne Area Navigation Equipment Using Multi-Sensor Inputs
TSO-C116 - 3/1/90	Crewmember Protective Breathing Equipment
TSO-C117a - 8/1/96	Airborne Windshear Warning and Escape Guidance Systems for Transport Airplanes
TSO-C118 - 8/5/88	Traffic Alert and Collision Avoidance System (TCAS) Airborne Equipment, TCAS I
TSO-C119a - 4/9/90	Traffic Alert and Collision Avoidance System (TCAS) Airborne Equipment, TCAS II
TSO-C120 - 1/26/88	Airborne Area Navigation Equipment Using Omega/VLF Inputs

TSO Number	Subject Title
TSO-C121 - 3/1/90	Underwater Locating Devices (Acoustic) (Self-Powered)
TSO-C122 - 4/11/94	Devices that Prevent Blocked Channels Used in Two-Way Radio Communications due to Similtaneous Transmissions
TSO-C123a - 8/2/96	Cockpit Voice Recorder Systems
TSO-C124b - 8/1/96	Flight Data Recorder Systems
TSO-C126 - 12/23/92	406 MHz Emergency Locator Transmitter (ELT)
TSO-C127 - 3/30/92	Rotorcraft and Transport Airplane Seating Systems
TSO-C128 - 7/20/93	Devices that Prevent Blocked Channels Used in Two-Way Radio Communications due to Unintentional Transmissions
TSO-C129a - 2/20/96	Airborne Supplemental Navigation Equipment Using the Global Positioning System (GPS)

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#### APPENDIX 2. INDEX OF TSO's GROUPDED BY SUBJECT MATTERS

Subject Title	TSO Number
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Automatic Pilots	TSO-C9c
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Gas Turbine Auxiliary Power Units	TSO-C77a
Communications Equipment	
<u>Amplifiers</u>	
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<u>Microphones</u>	
Aircraft Headsets and Speakers	TSO-C57a
Aircraft Microphones (For Air Carrier Aircraft)	TSO-C58a
Selective Calling Equipment	
Airborne Selective Calling Equipment (For Air Carrier Aircraft)	TSO-C59
<u>VHF</u>	
VHF Radio Communications Transmitting Equipment Operating Within 117.975 to 137.000 Megahertz	TSO-C37d
VHF Radio Communications Receiving Equipment Operating Within 117.975 to 137.000 Megahertz	TSO-C38d

#### Communications Equipment (Continued)

<u>HF</u>	
High Frequency (HF) Radio Communication Transmitting Equipment Operating Within the Radio Frequency Range of 1.5 and 30 Meghertz	TSO-C31d
High Frequency (HF) Radio Communication Receiving Equipment Operating Within the Radio Frequency Range 1.5 to 30 Megahertz	TSO-C32d
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Cockpit Voice Recorder Systems	TSO-C123a
Underwater Locating Devices (Acoustic) (Self-Powered)	TSO-C121
Electrical Power	
Airborne Static ("DC to DC") Electrical Power Converter (For Air Carrier Aircraft)	TSO-C71
Engine-Driven Direct Current Generators/Starter-Generators	TSO-C56a
Lithium Sulfur Dioxide Batteries	TSO-C97
Static Electrical Power Inverter	TSO-C73
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Aircraft Fabric Intermediate Grade, External Covering Material	TSO-C14b
Aircraft Fabric, Grade A, External Covering Material	TSO-C15d
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Special Aircraft Turnbuckle Assemblies and/or Turnbuckle Safetying Devices	TSO-C21b

Subject Title	TSO Number
Equipment Furnishing (Continued)	
Seats, Berths, and Safety Belts	
Aircraft Seats and Berths (Type I Transport, 6g Forward Load)	TSO-C25a
Aircraft Seats and Berths	TSO-C39b
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Hydraulic Hose Assemblies	TSO-C75

Subject Title	<u>2</u>	TSO Number
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	Airborne Passive Thunderstorm Detection Systems	TSO-C110a
	Airborne Radar Approach and Beacon Systems for Helicopters	TSO-C102
	Airborne Weather and Ground Mapping Pulsed Radars	TSO-C63c
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	Airborne Low-Range Radio Altimeter	TSO-C87
	Airborne Radar Altimeter Equipment (For Air Carrier Aircraft)	TSO-C67
	Aircraft Altimeter, Pressure Actuated Sensitive Type	TSO-C10b
	Airspeed Instruments	TSO-C2d
	Automatic Pressure Altitude Reporting Code Code Generating Equipment	TSO-C88a
	Bank and Pitch Instruments (Indicating Gyro-Stablized Type) (Gyroscopic Horizon, Attitude Gyro)	TSO-C4c
	Cockpit Voice Recorder System	TSO-C123a
	Direction Instrument, Magnetic (Gyro-Stablized Type)	TSO-C6d
	Direction Instrument, Magnetic Non-Stablized Type) (Magnetic Compass)	TSO-C7d

Subject Title	TSO Number			
Instruments (Continued)				
Flight Instruments (Continued)				
Direction Instrument, Non-Magnetic (Gyroscopically Stablized)	TSO-C5e			
Electric Tachmeter, Magnetic (Gyroscopically Stablized)	TSO-C49a			
Flight Data Recorder Systems	TSO-C124a			
Flight Directors	TSO-C52a			
Mach Meters	TSO-C95			
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Over Speed Warning Instruments	TSO-C101			
Vertical Velocity Instrument (Rate-of-Climb)	TSO-C8d			
Stall Warning Instruments	TSO-C54			
Temperature Instruments	TSO-C43b			
Turn and Slip Instruments	TSO-C3c			
Engine Instruments				
Fuel and Oil Quantity Instruments (For Reciprocating Engine Aircraft)	TSO-C55			
Manifold Pressure Indicating Instruments	TSO-C45			
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Subject Title	<u>e</u>	TSO Number
Landing Ge	ar Equipment (Continued)	
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	Aircraft Position Lights	TSO-C30c
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	Airborne ATC Transport Equipment	TSO-C74
	Airborne Automatic Dead Reckoning Computer Equipment Utilizing Aircraft Heading and Doppler Ground Speed and Drift Angle Data (For Air Carrier Aircraft)	TSO-C68a
	Airborne Distance Measuring Equipment (DME) Operating Within the Radio Frequency Range of 960-1215 Megahertz	TSO-C66c
	Air Traffic Control Radar Beacon System/Mode Select (ATCRBS/Mode S) Airborne Equipment	TSO-C112
	Airborne Doppler Radar Ground Speed and/or Drift Angle Measuring Equipment (For Air Carrier Aircraft)	TSO-C65a
	Airborne ILS Glide Slope Receiving Equipment Operating Within 328.6 to 335.4 Megahertz	TSO-C34e
	Airborne ILS Localizer Receiving Equipment	TSO-C36e
	Airborne Interim Standard Microwave Landing System Converter Equipment	TSO-C93
	Airborne Multipurpose Electronic Display	TSO-C113

Subject Title	<u>e</u>	TSO Number
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	Airborne Omega Receiving Equipment	TSO-C94a
	Airborne Radio Marker Receiving Equipment	TSO-C35d
	Airborne Automatic Direction Finding (ADF) Equipment	TSO-C41d
	Airborne Navigation Data Storage System	TSO-C109
	Airborne Supplemental Navigation Equipment Using the Global Postioning System (GPS)	TSO-C129a
	Airborne Weather and Ground Mapping Pulsed Radars	TSO-C63c
	Airborne Windshear Warning and Escape Guidance Systems for Transport Airplanes	TSO-C117a
	Optional Display Equipment for Weather and Ground Mapping Radar Indicators	TSO-C105
	Microwave Landing Systems (MLS) Airborne Receiving Equipment	TSO-C104
	Traffic Alert and Collision Avoidance System (TCAS) Airborne Equipment, TCAS I	TSO-C118
	Traffic Alert and Collision Avoidance System (TCAS) Airborne Equipment, TCAS II	TSO-C119a
	VOR Radio Receiving Equipment Operating Within the Radio Frequency Range of 108-118 Megahertz	TSO-C40c

Subject Matter	TSO Number			
Oxygen Equipment				
Continuous Flow Oxygen Mask Assembly (For Non-Transport Category Aircraft)	TSO-C103			
Crewmember Demand Oxygen Masks	TSO-C78			
Crewmember Protective Breathing Equipment	TSO-C116			
Oxygen Mask Assembly Continuous Flow, Passenger (For Air Carrier Aircraft)	TSO-C64a			
Oxygen Regulators, Demand	TSO-C89			
Protective Breathing Equipment	TSO-C99			
Propeller (Hose Assemblies)				
Propeller Feathering Hose Assemblies (Rubber and Wire Braid Construction)	TSO-C42			
Structure (Containers, Pallets, Nets)				
Cargo Pallets, Nets, and Containers	TSO-C90c			
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Ground Proximity Warning-Glide Slope Deviation Alerting Equipment	TSO-C92c			
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Survivor Locator Lights	TSO-C85			
406 Mhz Emergency Locator Transmitter (ELT)	TSO-C126			
Emergency Locator Transmitter (ELT) Equipment	TSO-C91a			

Subject Title	TSO Number
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Individual Floation Devices	TSO-C72c
Life Preservers	TSO-C13f
Liferafts (Reversible and Nonreversible)	TSO-C70a
Parachutes	TSO-C23d

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